

Remarks

Claims 1 - 8 are pending in the application. Group I, claims 1 – 7, have been provisionally elected. The provisional election is confirmed. Claim 8 has been withdrawn. Claims 1 - 7 are rejected. Claims 1, 3, 5, 6 and 7 have been amended. New claims 9 – 11 have been added. Claims 1 - 7 and 9 – 11 remain for consideration.

*Claim Rejections 35 U.S.C. §112*

The Examiner rejects claims 3, 5, 6 and 7 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention

The Examiner states that, “The phrase ‘for at least on repetition’ (cl 3, ln 1; cl 5, ln 1) is indefinite because it is idiomatically incorrect.

Claims 3 and 5 have been amended.

The Examiner states that, “The phrase ‘Step (c)(iii)’(cl 6, ln 1) is indefinite because there is no step (c)(iii) in any of the preceding the claims.

Claim 6 has been amended.

The Examiner states that, “The phrase ‘Step (c)(i) or (c)(iii)’ (cl 7, lines 1 - 2) is indefinite because there are no steps (c)(i) and (c)(iii).

Claim 7 has been amended.

*Claim Rejections 35 U.S.C. §103(a)*

The Examiner states, “Claims 1 - 7 are rejected . . . as being unpatentable over Zhang et al (USPN 6391220) in view of the admitted prior art set forth on page 2, lin 1 - pg 3, lin 7.”

The Examiner states,

“In regard to claim 1, Zhang et al teach the basic claimed process including a method of the assembly of a thin film (col 4, ln 57 - col 5, ln 6; figs 1 - 5);

applying a release layer/substrate to a support surface/substrate (col 2, lns 40 - 45; col 4, ln 57 - col 5, ln 6; figs 1 - 5) — as a note, it should be mentioned that the release layer and substrate of Zhang et al constitute the claimed substrate and support surface, respectively; forming a thin film upon the release layer by any suitable process such as electroplating (col 4, ln 57 - col 5, ln 6; figs 1 - 5); removing the release layer together with the thin film from the substrate (col 4, ln 57 - col 5, ln 6; figs 1 - 5); and separating the release layer from the thin film (col 4, ln 57 - col 5, ln 6; figs 1 - 5).

The Examiner notes,

“However, Zhang et al does not teach the claimed substeps for forming the thin film. The admitted prior art teaches it is well-known in the thin film technology to form thin films by the layer-by-layer (LBL) assembly method. The admitted prior art teaches that LBL comprising depositing a film on a substrate by repeating the process of: 1) immersion of the substrate in an aqueous solution of polyelectrolyte; 2) washing with a neat solvent; 3) immersion in an aqueous solution of nanoparticles; and 4) final washing with a neat solvent. This process can be repeated as many times as necessary depending on the number of layers required. Further, Zhang et al teaches that LBL is an attractive alternative to other thin film deposition techniques because it is simple and universal. Zhang et al and the admitted prior art are combinable because they are analogous with respect to forming a thin film assembly.”

The Examiner concludes that,

“Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the LBL method of the admitted prior art as the deposition process of Zhang et al in order to reduce process complexity.

The applicant respectfully disagrees with the Examiner's statements. The Examiner states that, “Zhang et al teaches that LBL is an attractive alternative to other thin film deposition techniques because it is simple and universal.” Applicant has been unable to locate any such teaching in Zhang et al.

The Examiner concludes, “Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the LBL method of the admitted prior art as the deposition process of Zhang et al in order to reduce process complexity.”

Applicant asserts that use of the LBL method as the deposition process of Zhang et al would not have been obvious to one of ordinary skill in the art at the time the invention was made for the following reasons set forth by the applicant in the specification:

Films produced by this process [LBL] may be extremely thin, on the order of a few hundred nanometers. (bracketed text added)(page, 6, line 6).

The free-standing LBL films produced in accordance with the present invention allow for the exploitation of these assemblies as ultrathin membranes with a variety of possible applications. . . . Preparation of such films from inorganic colloids affords a rich palette of mechanical, chemical, optical, electrical and magnetic properties. These properties are complemented by the mechanical durability of the polymers and biological activity of proteins, DNAs, RNAs, etc. that can also be incorporated into the LBL film. The LBL mode of their preparation makes possible the degree of structural organization of such membranes, which is hardly attainable by traditional methods of their production. (page 6, lines 18 -22)

In contrast to Applicant’s teachings, Zhang et al teach that, “The conductive and insulating layers in the conductive laminate 20 typically have a thickness of about 25 microns or less” (col. 5, lines 4 – 6). Zhang et al. also teach that, “Preferably, the cut conductive laminate portions 30 are separated from the substrate 10 by peeling” (col. 5, lines 39, 40).

As noted above, Zhang et al teaches layers on the order of 25 microns, while applicant teaches layers on the order of a few hundred nanometers. Applicant teaches

that layers are approximately 100 times thinner than the layers taught by Zhang et al.

Applicant teaches layer-by-layer films that are too thin to be “separated from the substrate by peeling” as taught by Zhang et al. Therefore, Zhang et al actually teach away from the use of Applicant’s LBL films.

Accordingly, Applicant has amended claim 1 to clarify that Applicant is claiming a method for use of layer-by-layer films as described in the specification. Applicant, therefore, requests allowance of amended claim 1.

The Examiner further rejects claims 2 - 7 as being unpatentable over Zhang et al (USPN 6,391,220) in view of the admitted prior art set forth on pg 2, line 1 - pg 3, ln 7.

Dependent claims 2 - 7 each depend, at least indirectly, from claim 1, which is submitted to be patentable for the reasons set forth above. Applicant, therefore, submits that dependent claims 2 - 7 are patentable for at least this reason.

#### *New Claims*

Applicant has added new dependent claims 9 – 11, which further define the step of removing the substrate from the thin film.

Claim 9 claims the step of dissolving the substrate. Claim 9 is supported in the specification at least on page 4, lines 22, 23 and page 6, lines 1 – 5 of the specification.

Claim 10 claims the step of chemically treating the substrate. Claim 10 is supported in the specification at least on page 6, lines 2, 3 of the specification.

Claim 11 claims the step of melting the substrate. Claim 11 is supported in the specification at least on page 6, lines 1 - 5 3 of the specification.

Considering the foregoing, it is sincerely believed that this case is in a condition  
for allowance, which is respectfully requested.

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This paper is intended to constitute a complete response to the outstanding Office Action.  
Please contact the undersigned if it appears that a portion of this response is missing or if there  
remain any additional matters to resolve. If the Examiner feels that processing of the application  
can be expedited in any respect by a personal conference, please consider this an invitation to  
contact the undersigned by phone.


Respectfully submitted,

10/30/03  
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